

Appl. No. 10/802,669
Amdt. dated May 17, 2006
Amendment under 37 CFR 1.116 Expedited Procedure
Examining Group 2878

PATENT

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

- 1 1. (currently amended) An optical device comprising
2 a primary grating;
3 an incoherent light source disposed opposing a predetermined side of the primary
4 grating;
5 a first reference grating disposed between the light source and the primary
6 grating;
7 a photodetector disposed opposing the predetermined side of the primary grating;
8 and
9 a second reference grating disposed between the photodetector and the primary
10 grating;
11 wherein the primary grating, the first reference grating and the light source are
12 configured for movement relative to one another;
13 wherein a period T_r of the first reference grating and a period T of the second
14 reference grating are related to a period T_s of the primary grating by the following formula:
15
$$\frac{1}{T} + \frac{1}{T_r} = \frac{1}{T_s};$$

16 such that incoherent light from said incoherent light source remains incoherent as
17 it impinges on said first reference grating, said primary grating and said second reference grating.
1 2. (original) The optical device of claim 1, wherein the primary grating is a
2 moving grating and the first reference grating and second reference grating are fixed gratings.

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1 3. (original) The optical device of claim 1, wherein the primary grating, light
2 source, first reference grating, second reference grating and photodetector are configured as an
3 optical position encoder device.

1 4. (original) The optical device of claim 1, wherein the grating is a reflective
2 grating.

1 5. (original) The optical device of claim 1, wherein the first reference
2 grating and second reference grating are configured for identical relative motion with respect to
3 the primary grating.

1 6. (canceled).

1 7. (original) The optical device of claim 1, wherein the light source is an
2 extended light source.

1 8. (original) The optical device of claim 7, wherein the extended light source
2 is a light emitting diode (LED).

1 9. (canceled).

1 10. (currently amended) An optical position encoder device comprising:
2 a moving grating with a period T_s ;
3 a photodetector with light sensitive components;
4 an incoherent light source disposed on the photodetector;
5 a first fixed grating with spatial period T_f disposed on the light source; and
6 at least one second fixed grating with period T disposed on the light sensitive
7 components;
8 wherein the moving grating is moveable relative to the first fixed grating and the
9 light source;

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10 wherein a period T_r of the first reference grating and a period T of the second
11 reference grating are related to a period T_s of the primary grating by the following formula:

12
$$\frac{1}{T} + \frac{1}{T_r} = \frac{1}{T_s};$$

13 such that incoherent light from said incoherent light source remains incoherent as
14 it impinges on said first fixed grating, said moving grating and said second fixed grating.

1 11. (canceled).

1 12. (canceled).

1 13. (original) The optical position encoder device of claim 10, wherein there
2 is a plurality of second fixed gratings with a fixed phase relationship thereamong such that the
3 photodetector receives only one harmonic component.

1 14. (original) The optical position encoder device of claim 13, wherein the
2 plurality of second fixed gratings are sinusoidal fixed gratings.

1 15. (currently amended) An optical device comprising
2 a primary grating;
3 an incoherent light source disposed opposing a predetermined side of the primary
4 grating;

5 a first reference grating disposed between the light source and the primary
6 grating;

7 a photodetector disposed on a far side of the primary grating; and
8 a second reference grating disposed between the photodetector and the primary
9 grating;

10 wherein the primary grating, the first reference grating and the light source are
11 configured for movement relative to one another;

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12 wherein a period T_r of the first reference grating and a period T of the second
13 reference grating are related to a period T_s of the primary grating by the following formula:

14
$$\frac{1}{T} + \frac{1}{T_r} = \frac{1}{T_s}$$

15 such that incoherent light from said incoherent light source remains incoherent as
16 it impinges on said first reference grating, said primary grating and said second reference grating.